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1992

EPA Superfund
Record of Decision:

ELLIS PROPERTY
EPA ID: NJD980529085
OU 01
EVESHAM TOWNSHIP, NJ
09/30/1992

DECLARATION STATEMENT

RECORD OF DECISION

ELLIS PROPERTY

SITE NAME AND LOCATION

Ellis Property
Evesham and Medford Townships, Burlington County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Ellis Property Site (the Site), which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision document explains the factual and legal basis for selecting the remedy for the Site.

The New Jersey Department of Environmental Protection and Energy concurs with the selected remedy. The information supporting this remedial action decision is contained in the administrative record for the Site.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial threat to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This is the first and only planned operable unit for the Ellis Property Site. The selected remedy addresses the remediation of contaminated soil on the Site and ground water in the underlying aquifer.

The major components of the selected remedy include the following:

- Excavation of contaminated soil and treatment/disposal at an approved off-site facility;

- Extraction of contaminated ground water from the shallow aquifer underlying the Site;

ROD FACT SHEET

SITE

Site name: Ellis Property

Site location: Sharp Road, Evesham Township, Burlington County, New Jersey

HRS score: 34.62

ROD

Date signed: September 30, 1992

Selected remedy: Excavation and off-site treatment/disposal of contaminated soil; extraction and treatment of contaminated ground water.

	SOIL	GROUND WATER
Capital cost:	$560,000	$1,340,000
O & M cost:	$188,200[a]	$365,000[b]/$283,000[c]
Present-worth cost:	$739,000	$5,914,000

<Footnotes>
a One year only
b Years 1 - 3
c Years 4 - 30
</footnotes>

LEAD

New Jersey Department of Environmental Protection and Energy

Primary EPA Contact: Richard Ho, (212) 264-9543

Secondary EPA Contact: Charles Tenerella, (212) 264-9382

Main PRP(s): Irving Ellis, telephone unknown

WASTE

Waste type: Drum washings and leaks or spills.

Waste origin: Drum storage and washing operation.

Estimated waste quantity: Soil--760 cubic yards; ground water-unknown.

Contaminated medium: Soil and ground water.

. Treatment of contaminated ground water in a facility to be constructed on the Site;

. Disposal of the treated ground water by reinjection; and

. Implementation of an environmental monitoring program to ensure the effectiveness of the remedy.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and it satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility or volume as their principal element.

Because the selected remedy will not result in hazardous substances remaining on the Site above health-based levels, a five-year review pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act, as amended, is not required. However, pursuant to Office of Solid Waste and Emergency Response Directive 9355.7-02, a review will be conducted at least every five years after initiation of the selected remedial action because cleanup levels will require five or more years to attain. The purpose of the reviews is to ensure that the remedy continues to provide adequate protection of human health and the environment.

TABLE OF CONTENTS

SITE NAME, LOCATION AND DESCRIPTION

SITE HISTORY AND ENFORCEMENT ACTIVITIES

HIGHLIGHTS OF COMMUNITY PARTICIPATION

SCOPE AND ROLE OF RESPONSE ACTION

SUMMARY OF SITE CHARACTERISTICS

SUMMARY OF SITE RISKS

DESCRIPTION OF REMEDIAL ALTERNATIVES

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

SELECTED REMEDY

STATUTORY DETERMINATIONS

DOCUMENTATION OF SIGNIFICANT CHANGES

APPENDICES

APPENDIX I. FIGURES
APPENDIX II. TABLES

SITE NAME, LOCATION AND DESCRIPTION

The Ellis Property Site (the Site) is located in Burlington County, east of Sharp Road and about 2,000 feet north of Evesboro-Medford Road in Evesham Township, New Jersey (Figure 1). The Site is surrounded by farmland and wooded lots, and is less than one mile from the nearest residential area. The property was once used as a dairy farm and is designated as Block 14, Lot 4 on the Evesham Township tax map. It comprises approximately 36 acres of land; 24 acres are located in Evesham Township and the remainder in Medford Township. Currently, there are no buildings on site. At the present time, the Site is overgrown with grasses and weeds.

Land in the area immediately surrounding the Site is primarily agricultural. Cultivated fields bound the Site to the north and south. Another field is found to the west, across Sharp Road. Approximately 60 residences were identified within one mile of the Site. This may be a low estimate because there are new housing developments in the area, especially near Coxs Corner.

To the east of the Site lies a wetland area, classified by the U.S. Fish and Wildlife Service (USFWS) as a palustrine ecological system with scrub/shrub and emergent plant classes. Although the wetlands receive surface water runoff from the Site, inundation and saturation of the wetland area is probably caused by discharge from the shallow ground-water table. Consequently, periodic drying of the wetlands occurs when the elevation of the ground-water table is reduced. The nearest free-flowing surface water is Sharps Run, approximately one-quarter mile north of the Site. Drainage from the wetlands eventually leads to Sharps Run. Sharps Run flows east through Medford Township to the southwestern branch of Rancocas Creek, approximately six miles east of the Site. The northeastern corner of the Site, which includes part of the wetlands, lies inthe 100-year floodplain.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

In 1968, Irving and Reba Ellis purchased the property and used part of it as a drum storage and reconditioning (drum cleaning) operation. Approximately four acres of the 36-acre tract were involved with this operation. The reconditioning operation ceased in 1978, after a fire damaged some of the buildings. However, storage of drums at the Site continued into the 1980s.

Initial Activities

In September 1980, the New Jersey Department of Environmental Protection and Energy (NJDEPE) investigated the Site following an anonymous complaint. The Site was reported to have been used as a drum recycling operation, where used drums and containers were brought, rinsed or cleaned, and then resold. The Site consisted of a two-story building, housing several washing tanks with troughs, three sheds, a storage area, and a boiler (Figure 2). The building contained 50 to 75 drums, many of which were full of unknown liquids. The three sheds also contained various-sized drums and chemical containers, many of which contained unknown substances. The area near the sheds was devoid of plant growth. About one hundred 55-gallon plastic drums were located adjacent to the sheds. One of these drums contained a dark green liquid with a pH of 1. The ground surrounding these drums was stained red and green. A soil sample taken from a depth of two feet had a pH of 2 and a bright green color. A natural swale and several man-made ditches led into a wetland, located approximately 700 feet east of Sharp Road. The troughs inside the larger building drained into one of these ditches. Sediments and surface water runoff entered the wetlands from the drainage ways (Figure 3).

Hundreds of drums and containers were spread haphazardly around the Site. Some of these drums were later found to contain oils, grease, acids, andvarious organic compounds. There was evidence of spills from past operations at the Site. Several drums were corroded, with the contents leaking onto the ground. A soil sample taken near a leaking drum was found to contain oil and grease. Subsequent inspections by the NJDEPE indicated that chemical spills onto the ground had occurred in several areas. Soil sampling and analysis by the NJDEPE revealed the presence of hydrochloric acid, heavy metals, and grease. Polychlorinated biphenyls (PCBs) were detected in concentrations up to 23.1 parts per million (ppm).

In April 1981, NJDEPE issued a Directive Letter to Mr. Ellis, instructing him to remove and dispose of the drums and contaminated soil from the Site. NJDEPE made numerous attempts to persuade Mr. Ellis to accept responsibility for the contamination on his property. In September 1982, the Evesham Municipal Utilities Authority filed a civil action in the Superior Court of New Jersey, Law Division, Burlington County (Docket No. L 24308-82) against Irving and Reba Ellis for the illegal storage of drums containing hazardous substances. In December 1982, NJDEPE filed a Civil Action Complaint in the Superior Court of New Jersey, Chancery Division, Burlington County (Docket No. C 1679-82) due to Mr. Ellis's failure to comply with the Directive Letter and the continued use of the Site for the storage of drums. In January 1983, the Burlington County Health Department and the NJDEPE conducted a survey of potable wells within an approximate 1-mile radius of the Site to determine if they were impacted by site contamination. The survey found that ten potable wells were completed in the Wenonah-Mount Laurel Aquifer, and that the Site had not impacted potable water supplies in the area. On August 30, 1983, an order was entered transferring the matter of NJDEPE v. Irving Ellis to the Law Division and consolidating it with the matter of Evesham Municipal Utilities Authority v. Irving Ellis and Reba P. Ellis. On February 10, 1983, an Order for Partial Summary Judgment was entered in the Superior Court against Irving Ellis in the consolidated cases in the amount of $49,084.98. The court also ordered Mr. Ellis to pay $53,000 in penalties. On June 6, 1984, in a Judgment Consent, the court ordered Mr. Ellis to pay the Evesham Municipal Authority $4,000 and forbade him to store, discharge, or spill hazardous substances at the Site.

The Site was included on the National Priorities List on September 1, 1983. On October 19, 1984, the U.S. Environmental Protection Agency (EPA) issued a General Notice Letter to Mr. Irving Ellis, informing him of his potential liability under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), with respect to the contamination at the Site. In May 1989, EPA initiated a search for other potentially responsible parties.

Removal Actions

In March 1983, utilizing the New Jersey Spill Compensation Fund, NJDEPE removed approximately one hundred drums containing acids and disposed of them at an approved off-site facility. Containerized solids and flammable liquids were also removed and disposed of, along with contaminated soil and sludge. In the acid spill area, the highly acidic surface soils were removed, and lime was tilled into the soil to neutralize the acid. Soils in the vicinity of the PCB disposal area were removed to a depth of approximately two feet and disposed at an approved off-site facility. The large building and sheds were demolished at that time because they were structurally unsafe. Private wells were also sampled and showed no contamination.

On February 22, 1989, NJDEPE requested that EPA conduct a drum removal action at the Site. On February 28, 1989, EPA conducted a preliminary assessment of the Site. An Emergency Response Cleanup Services (ERCS) contractorbegan site preparation, waste sampling, and stabilization on May 15, 1989. On October 23, 1989, the ERCS contractor was re-mobilized to segregate, stage, mark, and label a total of 218 drums containing hazardous waste material for offsite disposal. In addition, approximately 400 empty drums were crushed for offsite disposal. Removal of the drums was completed on April 17, 1990.

Remedial Investigation/Feasibility Study

In a letter, dated October 19, 1984, EPA offered Mr. Irving Ellis the opportunity to undertake, or finance, a Remedial Investigation and Feasibility Study (RI/FS) at the Site. Mr. Ellis declined the offer. Consequently, the RI/FS was initiated by the NJDEPE through a Cooperative Agreement with EPA. In November 1985, Roy F. Weston, Inc. (WESTON) was selected to perform a remedial investigation to characterize the geology and hydrology at the Site, and to identify the contaminants in the ground water, surface water, soils, and sediments.

Eighteen monitoring wells were installed at the Site. Eight wells were located in the shallow aquifer, three in the intermediate aquifer, and seven in the deep aquifer. Soil samples were taken at depths from 0 to 72 inches below ground surface. Surface water and sediments were collected from the drainage ways and the wetlands.

The RI identified contaminants in the ground water, surface water, soils, and sediments. The results of the RI are discussed later, under "Nature and Extent of Contamination." After characterizing the contamination at the Site, WESTON performed a feasibility study to identify and screen remedial technologies to address the potential risks to the public and the environment posed by the Site. The FS was based on information obtained during the RI and was completed in April 1992.

The National Historic Preservation Act requires federal agencies to examine the potential impacts of their actions to these places. As part of the RI/FS activities, WESTON conducted a Stage IA Cultural Resources Survey to identify whether any cultural resources on, or eligible for inclusion on, the National Register of Historic Places are located on, or near, the Site. The survey concluded that relatively undisturbed areas within 300 feet of the wetlands have a high potential for the presence of prehistoric archaeologic resources; areas between 300 and 1,000 feet from the wetlands have a moderate potential for prehistoric archaeologic resources.

A field investigation was conducted on March 28, 1992 to delineate jurisdictional wetlands on site. This investigation was documented in the Wetland Delineation Report: Ellis Property Superfund Site, prepared by the NJDEPE. The field investigation defined the boundary of the wetlands adjacent to or on the Site itself.

A search of the National Heritage database was conducted by WESTON to identify endangered/threatened species or critical habitat that may be impacted. The search revealed that observations of eight rare vertebrate species within an approximate 3-mile radius of the Site were recorded. Of the eight species observed, three have been classified as endangered by the State of New Jersey; five are classified as threatened by the State of New Jersey. These species are listed in Table 1A.

Table 1B lists other endangered/threatened species occurring in Burlington County. Although no sightings of these species have been recorded in the immediate vicinity of the Site, they may potentially use the Site as habitat.

The USFWS was contacted by EPA regarding the potential existence of federally-listed and proposed endangered and threatened species in the vicinity of the Site. The USFWS indicated that occurrence of the threatened Helonius bullata (swamp pink) is documented for the Rancocas Creek and several of its tributaries. However, the presence of the swamp pink has not been recorded for Sharps Run or the wetland.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI report, FS report, and the Proposed Plan for the Site were released to the public for comment on May 1, 1992. These documents were made available to the public in the administrative record file at the Evesham Township Municipal Building and the information repositories at the NJDEPE and EPA Docket Room in Region II, New York. The notice of availability for the above referenced documents was published in the Burlington County Times on May 1, 1992. The public comment period on these documents was scheduled from May 1, 1992 to May 30, 1992, and subsequently extended to June 15, 1992 upon request from the public.

On May 13, 1992, NJDEPE conducted a public meeting at the Evesham Township Municipal Building to inform local officials and interested citizens about the Superfund process, to discuss proposed remedial activities at the Site, and to respond to questions from area residents and other interested parties.

Responses to the comments received at the public meeting, as well as written comments received during the public comment period, are included in the Responsiveness Summary.

SCOPE AND ROLE OF RESPONSE ACTION

This response action addresses remediation of the contaminated media at theEllis Property Site. It includes remedial alternatives to address contaminated soil and ground water, and focuses on the protection of human health and the environment. No other operable units are planned for the future.

SUMMARY OF SITE CHARACTERISTICS

Site Geology and Hydrology

The Ellis Property is situated in the central portion of the Atlantic Coastal Plain, which extends from the fall line located west of the Delaware River to the Atlantic Ocean. The Coastal Plain regionally slopes gently to the southeast. The topography is generally flat in the area. The Site consists of silty sand with clay lenses, and is underlain by the Hornerstown Sand (shallow aquifer), which is comprised of silty sand and clay lenses. Underlying the shallow aquifer is the Navesink Sand, which is interbedded with glauconitic clay and sand. These two formations, which function as a confining layer, are just above the Wenonah-Mount Laurel Sand, a major source of potable water for domestic wells in the vicinity of the Ellis Property Site. The Magothy-Raritan aquifers, which underlie the Wenonah-Mount Laurel Sand, are confined by clay formations which separate them from less productive aquifers. The Magothy-Raritan aquifers are a significant source of municipal water supply in the vicinity of the Site.

Based on available information, the water quality in the deeper aquifers do not appear to be impacted at present by the contaminants in the shallow aquifer. A Burlington County Health Department survey found no private wells near the Site located in the shallow aquifer, although there are no restrictions on well locations to prevent its use as a domestic water supply. The shallow aquifer is not currently used as a source of public water supply because of its low productivity; however, it is a potential source of recharge for the underlying aquifers at the Site. Ground water beneath the Site is located in the New Jersey Coastal Plain Sole Source Aquifer, and is therefore, classified as "Class II potable water" (i.e., drinking water).

Shallow ground-water flow at the Site is to the east or east-northeast. Hydraulic conductivity values calculated for the shallow aquifer ranged from 0.41 to 1.63 feet per day.

Sharps Run is a tributary of the south branch of the Rancocas Creek. The NJDEPE has classified the south branch of the Rancocas Creek, from Vincentown to the Delaware River, and its tributaries as FW2-NT, non-trout producing general surface waters.

Nature and Extent of Contamination

The scope of the RI at the Ellis Property Site included investigations in all media that may be contaminated. The predominant contaminants in the soil, ground water, surface water, and sediments, and their respective range of concentrations are summarized in Table 2. Surface water, sediments, and air quality were investigated and determined not to be contaminant pathways of concern. Contaminated soil and ground water represent the primary contaminant exposure pathways at this Site.

The predominant soil contaminants and the respective range of concentrations, in parts per million (ppm), detected at the Site include: arsenic (1.4-31.8 ppm), lead (2.2-3,790 ppm), PCBs (0.31-23.1), and bis (2-ethylhexyl) phthalate, a base neutral/acid extractable (BNA) compound, (0.045-2.3 ppm). Approximately 690 cubic yards (yd[3]) of soil are contaminated with metals, 60 yd[3] with PCBs, and 10 yd[3] with BNA compounds. The contamination appears to be the result of chemical spillage or leakage onto the ground. Migration of soil contaminants is likely due to surface soil erosion and surface water runoff, predominantly towards the east.

Ground-water contamination appears to be limited to the shallow aquifer. The predominant contaminants and the respective range of concentrations, in parts per billion (ppb), detected at the Site are: antimony (19-2,123 ppb), arsenic (15.8-91 ppb), beryllium (1.55-10.2 ppb), 1,2-dichloroethene (1,2DCE) (5-520 ppb), methylene chloride (6-52 ppb), nickel (10.9-147 ppb), tetrachloroethene (PCE) (760-33,000 ppb), trichloroethene (TCE) (11-24,000 ppb), 1,1,2-trichloroethane (3-14 ppb), total chromium (12-404 ppb), and lead (4.3-71 ppb). The concentrations of antimony, arsenic, beryllium, chromium, 1,2DCE, methylene chloride, nickel, 1,1,2-trichloroethane, TCE, and PCE exceed the drinking water Maximum Contaminant Levels (MCLs). Lead exceeds the National Primary Drinking Water action level. A comparison of the range of concentrations detected and MCLs is shown in Table 3. Ground-water contamination also appears to be the result of chemical spillage or discharge from drum washing operations or leakage from stored drums. There were no underground storage tanks at the Site.

TCE and PCE are nonpolar, halogenated compounds with low solubilities in water. These compounds are more dense than water. When introduced as a free product, they tend to sink and form dense nonaqueous phase liquids (DNAPLs), with an indeterminate portion going into solution. As shown in Table 3-25 of the RI report, the highest concentration of TCE (i.e., 24,000 ppb) was found in monitoring well MW-2. This concentration is above the New Jersey drinking water MCL of 1 ppb. Lower TCE concentrations were observed in wells MW5, MW-6, and MW-7, located east and southeast of MW-2. All of these wells were installed in the shallow aquifer. The clay/silt layer, approximately 17 to 25 feet below ground surface, is believed to act as a barrier to vertical TCE migration, since no contamination has been found in the intermediate and deep monitoring wells. Boring logs indicate that this clay/silt layer appears to slope in a southeasterly direction across the Site. Therefore, TCE would be expected to migrate from well MW-2 toward wells MW-6 and MW-7, if the clay layer is continuous. The evidence seems to suggest the existence of a TCE source in the vicinity of the lime-tilled area. The presence of PCE at 15,000 ppb and 33,000 ppb at MW-7 and its absence at other monitoring wells indicates the potential existence of another suspected source of DNAPLs. However, soil and ground-water sampling during the RI did not reveal the existence of DNAPL sources. Additional studies would be performed, and monitoring wells wouldbe installed, during the design phase, so that the contamination plume and the possible existence of a DNAPL source can be examined more fully.

SUMMARY OF SITE RISKS

WESTON conducted a baseline risk assessment to evaluate the potential risks to human health and the environment associated with the Site. The Baseline Risk Assessment focused on contaminants in the ground water, surface water, soil, and sediments that are likely to pose significant risks to human health and the environment. The Baseline Risk Assessment report consists of a Human Risk Assessment and an Ecological Risk Assessment.

Human Risk Assessment

The Human Risk Assessment portion of the Baseline Risk Assessment report identified several exposure pathways by which the public may be exposed to contaminant releases at the Site under current and future land-use conditions. Surface water, soil, and sediment exposures were assessed under a potential present land-use scenario. Ground-water exposure was not evaluated because there are no residents on site, and based on available information, the shallow ground water is not used as a source of drinking water by residents within a 1-mile radius. Ground water, surface water, soil, and sediment exposures were assessed under a future land-use scenario. Reasonable maximum exposure scenarios were used in assessing both the present and potential future risks.

Currently, the Site is not securely fenced and is accessible by foot. Under current land-use conditions, trespassers represent the probable population exposed to site contamination. The most likely trespasser is an adult hunter/recreational user. Therefore, an adult trespasser was evaluated under the current scenario. The trespasser was assumed to live off site and, on the average, trespass on the Site one day/week, 52 weeks/year. This was an estimate, considering hunting season durations, as well as other potential recreational activities at the Site by a trespasser, which may be higher during warmer months and lower during the colder months. The adult trespasser was considered to be on site for three hours per exposure event and exposed to on-site surface soils, surface water, and sediments. The exposure duration was considered to be 30 years.

Unrestricted future land-use of the Site was assumed. Therefore, a future residential land-use scenario was evaluated. Two age groups were evaluated for the future resident--a child aged 1-6 years and an adult. The future resident was assumed to be on site on a daily basis, year-round. Exposure to surface soils was assumed to occur during outdoor activities such as gardening, yard work, and recreational activities, and indirectly through ingestion of home-grown vegetables. A year-round exposure to soils of 350 days/year was assumed. In addition, contact with surface water and sediments in the wetlands was assumed to occur during recreational activities, such as wading. Due to the shallow depth of these surface waters, recreational activities were assumed to be limited.

The exposure pathways of concern for current land-use include: (1) incidental ingestion of, and dermal contact with, chemicals in the soil and sediments, (2) inhalation of wind-blown dust, and (3) dermal contact with surface water. The potential exposure pathways of concern for future land-use include those for current land-use as well as the following: (1) ingestion of chemicals in ground water, (2) dermal contact with chemicals in ground water, (3) inhalation of volatile organic chemicals in ground water during showering or bathing, and (4) consumption of home-grown fruits and vegetables. For both the current and future land-use scenarios, a reasonable maximum exposure was evaluated.

Under current EPA guidelines, the likelihood of carcinogenic(cancer-causing) and noncarcinogenic effects due to exposure to site chemicals are considered separately. It was assumed that the toxic effects of the site related chemicals would be additive. Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Noncarcinogenic risks were assessed using a hazard index (HI), based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of milligrams per kilogram per day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds across all media that impact a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for noncarcinogenic adverse health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of (mg/kg-day)[-1], are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely.

For known or suspected carcinogens, risk is represented in terms of an individual's likelihood of developing cancer as a result of exposure to a carcinogenic chemical present in the exposure media. For example, a cancer risk level of 1 x 10[-3] indicates that an individual has a one in a thousand chance of developing cancer during their lifetime. Or, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one thousand people. EPA considers excess upper-bound individual lifetime cancer risks of 1 x 10[-4] to 1 x 10[-6] to be acceptable. This level represents that an individual has not greater than a one in ten thousand to a one in a million increased chance of developing cancer as a result of a site-related exposure to a carcinogen over a 70-year lifetime under specific exposure conditions at the Site. Generally, if the lifetime excess cancer risk exceeds 1 x 10[-4], the contamination is of sufficient concern to consider a remedial action. If the excess cancer risk falls between 1 x 10[-4] and 1 x 10[-6], the need for a remedial action is evaluated on a site-specific basis. Finally, where the calculated lifetime excess cancer risk is below 1 x 10[-6], no remedial action is generally required.

The results of the Baseline Risk Assessment indicate that under the current land-use scenario, noncarcinogenic health effects to an adult trespasser are not likely, based on the potential exposure pathways and routes evaluated. The HI for this scenario was less than 1.0. Similarly, the estimated carcinogenic risk was found be within EPA's acceptable cancer risk range.

Therefore, carcinogenic and noncarcinogenic health effects from exposure to soils, surface water, and sediments at the Site are not likely, under current land-use conditions.

Under the future residential land-use scenario, carcinogenic and noncarcinogenic health effects are likely, based on the potential exposure pathways and routes evaluated for a future resident. The carcinogenic risk was calculated to be 1.26 x 10[-2] (1.26 in a hundred), and was attributable to arsenic, a known human carcinogen, and PCE and TCE, which are probable human carcinogens. The exposure pathways with the greatest carcinogenic potential risk for the future resident are ingestion of home-grown produce, ingestion of chemicals in the ground water, and non-ingestion uses of ground water (i.e., bathing). The HIs for the future child and adult resident were calculated to be 362 and 127, respectively. The exposure pathways with the greatest potential noncarcinogenic risk for the future child resident (the most sensitive receptor) are ingestion of home-grown produce, incidental ingestion of soil, dermal contact with soil, inhalation of windblown dust, ingestion of chemicals in the ground water, and non-ingestion uses of ground water (i.e., bathing). Risk was attributable to several compounds, including PCBs, chromium, and bis (2-ethylhexyl) phthalate.

There are no restrictions which prohibit the use of the shallow aquifer as a source of potable water supply. Consequently, in the worst case scenario, the risk assessment assumed that future residents might use the shallow aquifer as an untreated source of potable water.

Health risks associated with exposure to surface water and sediments at the Site were evaluated for both the current and future land-use scenarios. The pathways analyzed include incidental ingestion of sediment in the wetlands and drainage ways, and dermal contact with sediments and surface water in the wetlands and drainage ways. In both the current and future land-use scenarios, the carcinogenic health risk associated with these pathways was found to range from 1 x 10[-7] to 1 x 10[-10], which does not exceed the acceptable risk range of 1 x 10[-4] to 1 x 10[-6]. Similarly, noncarcinogenic HIs for both scenarios were found to be substantially less than 1.0. Therefore, these pathways do not pose significant health concerns.

Ecological Risk Assessment

The Ecological Risk Assessment (ERA) evaluated potential impacts to the environment associated with the contaminants at the Site. The assessment focused on the potential impacts of contaminants of concern found in the soil, surface water, and sediments, to terrestrial and aquatic flora and fauna that inhabit, or are potential inhabitants, of the Site. The contaminants of concern included pesticides, PCBs, lead, cadmium, chromium, and organic compounds. The ecological receptors that were considered are: white-tailed deer, woodcock, red-tailed hawk, aquatic organisms, and terrestrial plants.

The ERA indicated that contaminated soil posed a risk to white-tailed deer and woodcock. The greatest risk to the white-tailed deer was attributed to browse ingestion. The ingestion of soil and earthworms posed the greatest risk to the woodcock.

The ERA indicated that the contaminated surface water and sediments in the drainage ways do not pose an unacceptable risk to aquatic life. The contaminated surface water and sediments in the wetlands posed a marginal, but not unacceptable, risk to aquatic life. The ERA showed that the contaminants at the Site posed no unacceptable risks to the red-tailed hawk and terrestrial plants.

Sediment contamination in the wetlands appears to be the result of surface soil erosion from the Site. The remediation of soil contamination at the Site would reduce further migration of soil contaminants into the wetlands by eliminating the soil erosion pathway. Remediating the soil contaminants would also reduce the potential for soil contaminants to infiltrate the ground water and discharge into the wetlands, through the high water table.

Uncertainties In Risk Assessment

The risk assessment process involves numerous conservative assumptions, all of which contributed to uncertainty in the risk evaluation. In general, sources of uncertainties associated with the risk assessment include: environmental sampling and analysis, exposure assessment, and toxicity assessment.

Uncertainties in environmental sampling arise in part from the potentially uneven distribution of chemicals in the media sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the Site, and is highly unlikely to under-estimate actual risks related to the Site.

Conclusion

Based on the results of the Baseline Risk Assessment, NJDEPE and EPA determined that the contaminated soil and ground water at the Site pose an unacceptable risk to human health. In addition, contaminated soil poses an unacceptable risk to the environment.

The contaminants in the surface water and sediments in the drainage ways do not pose an unacceptable risk to human health or the environment. The ERA indicated that the surface water and sediments in the wetlands pose a marginal, but not unacceptable, risk to aquatic life. NJDEPE and EPA determined that the contaminants in the surface water and sediments in the wetlands do not pose an unacceptable risk to the environment for the following reasons. The potential for aquatic exposure to contaminants in the surface water and sediments is low, considering that there is seldom any standing surface water in the wetlands. The surface water samples that were collected are not believed to be representative of actual surface water. There was little or no surface water in the wetlands during the RI sampling events. Surface water was created by depressing a beaker, or digging a hole, into the surface of the wetlands and allowing water to fill the depression or hole. Samples were taken with a bailer, which stirred up the sediments. Because lead adheres to sediment particles, the presence of sediments in the water samples resulted in artificially high concentrations of lead. The calculated risks associated with the contaminated sediments in the wetlands are not believed to be representative of actual risks. The risks associated with the sediments were formulated using overly conservative assumptions based on toxicity values that are more applicable to saltwater systems. However, these toxicity values are routinely used as a screening mechanism and are not used to establish cleanup levels. Exceedance of these toxicity values does not necessarily indicate that an ecological risk exists at the Site.

A remedial action to address the wetlands is not necessary since NJDEPE and EPA that the contaminants in the surface water and sediments of the wetlands do not pose an unacceptable risk to human health or the environment.

Actual or threatened releases of hazardous substances from this Site, if not addressed by the selected alternative or one of the other remedial measures considered, may present an imminent and substantial endangerment to the public health, welfare, and the environment through the continued migration of contaminants from the Site.

Remedial Action Objectives

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the Baseline Risk Assessment.

Because the Baseline Risk Assessment established that the soil and ground water at the Site poses an unacceptable risk to human health and the environment, the following remedial action objectives were established:

Soil

- Prevent contact with contaminated soil, which represents an unacceptable risk, or reduce contaminant concentrations in the soil below risk-based levels.

- Prevent further migration of soil contaminants into the ground water.

. Prevent migration of contaminated soils off site.

Ground Water

. Prevent the migration of contaminated ground water off site.

. Prevent the migration of contaminated ground water into the underlying aquifers.

. Return the aquifer to its designated use as a source of drinking water by reducing contaminant concentrations in the shallow ground water to drinking water quality.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, comply with other statutory laws, be cost effective, and utilize permanent solutions, alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

This Record of Decision evaluates remedial alternatives for addressing soil and ground-water contamination at the Ellis Property Site. Since NJDEPE and EPA determined that the surface water and sediment contamination in the wetlands and drainage ways do not pose an unacceptable risk to human health or the environment, remedial alternatives for the surface water and sediments are not warranted.

The estimated capital cost, operation and maintenance (O&M) costs, and net present worth costs of each alternative discussed below are provided for comparison. The estimated implementation time reflects only the time required to construct or implement the remedy, and does not include the time required to design the remedy, negotiate with the responsible parties, or procure contracts for design and construction.

Soil Alternatives

The FS considered the following general response actions for the contaminated soil at the Ellis Property Site: no action, institutional controls, excavation with treatment and disposal, and capping. Those alternatives which passed the screening process are summarized below.

Alternative SS-3, which consists of excavation of surface soils, on-site treatment, and on-site disposal, was analyzed in the FS. It did not pass the screening process because the relatively small volume of contaminated soil did not justify the construction of an on-site treatment system; therefore, this alternative is not included below.

Alternative SS-1: NO ACTION

Estimated Capital Cost: 0
Estimated Annual O&M Cost: $42,000
Estimated Net Present Worth Cost: $117,000
Estimated Implementation Time Frame: None

CERCLA requires that a "No Action" alternative be evaluated at every site to establish a baseline for comparison to the other alternatives. Under this alternative, EPA and NJDEPE would take no further action at the Site. Current site contaminants would be left in place, and no changes in levels of these contaminants would be expected except for those resulting from natural attenuation, biodegradation, or weathering. Access to the Site would be unrestricted, allowing trespassers and wildlife to be exposed to the contaminants.

Because this alternative would result in contaminants remaining on site, CERCLA requires that the Site be reviewed at least every five years. If justified by the review, remedial actions would be evaluated at that time to address the contamination. The cost estimates above include the cost to perform this review.

Alternative SS-2: INSTITUTIONAL CONTROLS

Estimated Capital Cost: $40,000
Estimated Annual O&M Cost: $25,000
Estimated Net Present Worth Cost: $110,000
Estimated Implementation Time: 6 months

Under this alternative, measures would be taken to reduce the potential risks to public health and the environment. This would include the construction of a fence around the perimeter of the Site and placement of warning signs to restrict access. Deeds would be modified to restrict site development. These measures are aimed at reducing potential contact with the contaminated soil. Current levels of contaminants would remain at the Site. As in the No Action alternative above, the Site would be reviewed at least every five years. The cost estimates above include the cost to perform this review.

Alternative SS-4: EXCAVATION AND OFF-SITE TREATMENT/DISPOSAL

Estimated Capital Cost: $560,000
Estimated Annual O&M Cost: $188,200 (1 year only)
Estimated Net Present Worth Cost: $739,000
Estimated Implementation Time: 1 year

Alternative SS-4 would include excavation of contaminated soil, and treatment/disposal at an approved off-site facility, i.e., landfill and/or hazardous waste incinerator. It is anticipated that soil contaminated with PCBs and/or organic compounds would be treated at an incinerator, while soil contaminated with heavy metals would be disposed at a landfill. An incinerator would not be effective in destroying heavy metals. The concentrations of PCBs and BNA compounds currently present in the soil would permit disposal in a landfill. However some stabilization for the metal-contaminated soils may be required on site or off site, prior to disposal. The need for stabilization would be determined during the design phase. The excavated area would be back-filled with clean fill. Under this alternative, soil contaminants would be remediated to EPA's risk-based levels. The soil is primarily contaminated with heavy metals (approximately 690 yd[3]). The amount of soil contaminated with PCBs and BNA compounds was estimated to be 60 yd[3] and 10 yd[3], respectively. The O&M and net present worth costs include the cost of treatment or stabilization of the soils prior to disposal.

Alternative SS-5: CAPPING OF SURFACE SOILS

Estimated Capital Cost: $630,000
Estimated Annual O&M Cost: $100,800
Estimated Net Present Worth Cost: $2,180,000
Estimated Implementation Time: 2 years

Under Alternative SS-5, contaminated surface soils above risk-based cleanup levels would be covered with an impermeable multi-layer cap. This would prevent exposure to the contaminants, and prevent migration of contaminants off site and into the ground water through infiltration. The cap would be designed to meet Federal and State of New Jersey requirements for hazardous waste disposal facilities. The design of a multi-layered cap, to satisfy these requirements, would consist of an upper vegetative layer underlain by a drainage layer over a low permeability layer. The low permeability layer would be designed to minimize infiltration of water into the contaminated soil below. The drainage layer would consist of sand, which would decrease the amount and residence time of water contacting the low permeability layer, thereby minimizing water infiltration. The drainage layer would be sloped to an exit toe drain, which would allow the water to be expelled. The upper vegetative cover would consist of about two feet of topsoil. The topsoil would be capable of providing long-term vegetative support and would be graded to a uniform slope between 3 and 5 percent. The vegetation would be chosen to minimize erosion and promote drainage off the cap.

As in the No Action alternative above, the Site would be reviewed at least every five years because contaminants would remain on site. The cost estimates above include the cost to perform this review.

Ground-Water Alternatives

The following general response actions were considered in the FS for contaminated ground water: no action, institutional controls, and extraction and treatment. Below are summaries of the groundwater alternatives.

Alternative GW-1: NO ACTION

Estimated Capital Cost: $30,000
Estimated Annual O&M Cost: $61,000
Estimated Net Present Worth Cost: $200,000
Estimated Implementation Time: None

CERCLA requires that a "No Action" alternative be evaluated at every site to establish a baseline for comparison to the other alternatives. Under this alternative, EPA and NJDEPE would take no further action at the Site. Current ground-water contaminants would remain, and no changes in levels of these contaminants would be expected except those resulting from natural attenuation, migration, or biodegradation. Access to the shallow ground water at the Site would be unrestricted, allowing potential exposure to the contaminants. This alternative would not prevent the potential migration of contaminants off site or into the deeper aquifers.

Because this alternative would result in contaminants remaining on site, CERCLA requires that the Site be reviewed at least every five years. If justified by the review, remedial actions would be evaluated at that time to address the contamination. The above cost estimates include the cost to perform this review.

Alternative GW-2: INSTITUTIONAL CONTROLS

Estimated Capital Cost: $74,000
Estimated Annual O&M Cost: $180,000
Estimated Net Present Worth Cost: $575,000
Estimated Implementation Time: 6 months

Alternative GW-2 would include the implementation of deed and well restrictions to reduce the potential for exposure to groundwater contaminants. These restrictions may completely ban the installation of wells in a particular area, or they may establish well siting or construction specifications and the minimum depth to which wells must be installed. Current site contaminants would be remain, and no changes in levels of these contaminants would be expected except those resulting from natural attenuation, migration, or biodegradation.

As in the No Action alternative above, the Site would be reviewed every five years. The cost estimates above include the cost to perform this review.

Alternative GW-3: EXTRACTION AND TREATMENT OF CONTAMINATED GROUND WATER

Estimated Capital Cost: $1,340,000
Estimated Annual O&M Cost: $365,000 years 1-3; $283,000 years 4-30
Estimated Net Present Worth Cost: $5,914,000
Estimated Implementation Time: 30 years

Under this alternative, an interceptor trench and/or extraction wells would be installed to collect shallow ground water. The exact number and precise location of the extraction wells and the optimum pumping rate would be determined during design. The design of the treatment system would be based upon additional tests and investigations to be conducted during the remedial design phase. The contaminated ground water would be pumped to an on-site treatment system that would remove metals by precipitation and ultrafiltration, and remove volatile organic compounds (VOCs) by air stripping. The ground water would be treated to meet Federal and New Jersey Safe Drinking Water Standards. The treated ground water would be reinjected. Ground-water monitoring would be performed during and following active remediation. Further treatment of the air stream may be required to comply with New Jersey's Air Pollution Control Regulations for VOC and toxic emissions.

The installation of an interceptor trench and extraction wells may affect the natural flow of ground water and surface water to the wetlands. The ground-water extraction system may affect the hydrology of the wetlands. To the maximum extent practicable, the interceptor trench and extraction wells would be placed in locations that avoid or minimize any impacts. If it is determined during design that hydrological impacts to the wetlands are significant, ground water from the clean aquifer below the shallow aquifer would be pumped and discharged into a nearby swale that drains into the wetlands to minimize any hydrological impacts. It is anticipated that half as many monitoring well samples would be required in years 4 through 30 than in the first 3 years because the contaminant concentrations would be expected to decline through the extraction and treatment of the ground water. This is reflected in the annual O&M costs for this alternative.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan, a detailed analysis of each remedial alternative was performed with respect to each of the nine criteria. This section discusses and compares the performance of the remedial alternatives under consideration against these criteria. These criteria were developed to address the requirements of Section 121 of CERCLA to ensure all important considerations are factored into remedy selection decisions. All selected remedies must at least satisfy the Threshold Criteria. The selected remedy should provide the best trade-offs among the Primary Balancing Criteria. The Modifying Criteria are evaluated following the public comment period.

Threshold Criteria

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of Federal and State environmental statutes and requirements and/or provide grounds for invoking a waiver.

Primary Balancing Criteria

3. Long-term effectiveness and permanence refers to the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once remedial objectives have been met.

4. Reduction of toxicity, mobility or volume through treatment addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility or volume of the hazardous substances as a principal element.

5. Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until the remedial objectives are achieved.

6. Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular alternative.

7. Cost includes estimated capital and operation and maintenance costs, and the present-worth costs.

Modifying Criteria

8. State acceptance indicates whether, based on its review of the RI/FS and the Proposed Plan, the State supports, opposes, and/or has identified any reservations regarding the preferred alternative.

9. Community acceptance refers to the community's comments on the alternatives described in the Proposed Plan, and the RI and FS reports. Responses to public comments are addressed in the Responsiveness Summary of this ROD.

A comparative analysis of the remedial alternatives based upon the aforementioned evaluation criteria follows.

Overall Protection of Human Health and the Environment

Risks to human health and the environment would not be eliminated through Alternative GW-1, No Action, because it would not address contaminants in the ground water, which pose an unacceptable risk. In addition, ground-water degradation would continue because migration of contaminants would not be controlled.

Alternative GW-2, Institutional Controls, would reduce the potential for on-site contact through the placement of deed restrictions. However, it would not prevent the migration of contaminants off site or into the deeper aquifers, allowing ground-water degradation to continue. Therefore, Alternative GW-2 would not be protective of human health and the environment. Since Alternatives GW-1 and GW-2 would not be protective of human health and the environment, they will not be discussed further.

Alternative GW-3, Extraction and Treatment of Ground Water, would protect human health by reducing contaminant concentrations in the ground water to acceptable levels, and by preventing further migration. If it is determined during design that the extraction of contaminated ground water will adversely affect the hydrology of the wetlands, engineering controls would be designed to mitigate the hydrological impacts to the wetlands. Therefore, Alternative GW-3 would be protective of human health and the environment.

Risks to human health and the environment would not be eliminated through Alternative SS-1, No Action, because it would not address the contaminants in the soil, which pose an unacceptable risk. In addition, groundwater degradation due to the uncontrolled infiltration of soil contaminants would continue.

Alternative SS-2, Institutional Controls, would reduce the potential for on-site contact through deed restrictions and the installation of a fence around the Site. However, it would not provide protection of human health and the environment because it would not control off-site migration or infiltration of contaminants. Since Alternatives SS-1 and SS-2 would not be protective of human health and the environment, they will not be discussed further.

Alternative SS-4, Excavation and Off-Site Treatment/Disposal, would remove contaminants from the soil and prevent further migration of contaminants into the ground water, thereby protecting human health and the environment.

Alternative SS-5, Capping, would reduce the potential for contact with the contaminated soil, thereby reducing the risk posed by the direct contact exposure pathway. In addition, deed restrictions would need to be placed on the property to restrict future land-use, and thereby reduce potential contact with the contaminated soils.

Compliance with ARARs

There are several categories of ARARs: action-specific, chemical specific, and location-specific. Action-specific ARARs are technology or activity-specific requirements or limitations related to various activities of the project. Chemical-specific ARARs are usually numerical values which establish the amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. Location-specific ARARs are restrictions placed on the concentrations of hazardous substances or the conduct of activities solely because they occur in a special location.

Action-Specific ARARs

Action-specific ARARs affecting Alternative SS-4 include Land Disposal Restrictions (LDR), Resource Conservation and Recovery Act (RCRA), and Toxic Substances Control Act (TSCA) requirements for treatment and disposal of hazardous substances.

Under Alternative SS-4, stabilization of the excavated soils would comply with LDR, which requires contaminated materials to be treated to meet standards before placement in a landfill. RCRA mandates that owners and/oroperators of incinerators receiving hazardous wastes must have operating permits and meet specified treatment standards. Alternative SS-4 would comply with this ARAR by sending excavated soils for treatment at an approved facility that meets these requirements. PCB-contaminated soils would be treated at an approved facility that meets TSCA standards for incinerators.

Under Alternative SS-5, the multi-layer cap would be designed, constructed, and installed to meet RCRA and New Jersey requirements for performance and operating standards.

Chemical-Specific ARARs

Because ground water at the Site is classified as Class II (i.e., drinking water), the following are considered relevant and appropriate requirements: National Primary Drinking Water Standards and New Jersey Safe Drinking Water Act Maximum Contaminant Levels for Hazardous Contaminants, and/or New Jersey Ground Water Quality Standards.

Alternative GW-3 would comply with ARARs. Ground water would be treated to meet ARARs prior to reinjection. VOC emissions from the air stripper would comply with New Jersey's "Control and Prohibition of Air Pollution by Volatile Organic Substances" and "Control and Prohibition of Air Pollution by Toxic Substances."

Since there are no ARARs for soil cleanup, contaminated soils would be remediated to site-specific risk-based levels. Alternative SS-5 does not include any treatment or disposal, and would not attain risk-based soil cleanup levels because contaminant concentrations would not be reduced. Alternative SS-4, Excavation and Off-Site Treatment/Disposal, would remove soil contaminants that are above EPA's risk-based levels and eliminate the risks associated with exposure.

Location-Specific ARARs

Location-specific ARARs affecting the remedial action include the Safe Drinking Water Act, National Historic Preservation Act, Endangered Species Act, and the Wetlands Act of 1970.

Long-Term Effectiveness and Permanence

Alternative GW-3, Extraction and Treatment of Ground Water, would be effective in treating the contamination in the shallow ground water. However, Alternative GW-3, in and of itself, would not attain the drinking water MCLs in the long term because soil contaminants would continue to infiltrate into the ground water. When paired with the appropriate source control alternative, it would attain MCLs more effectively. Treatment residuals, such as dewatered sludge, would be transported off site for disposal at an approved facility. Therefore, no long-term risks would be posed by these treatment residuals. Treated effluent would be monitored to ensure that it meets applicable discharge criteria.

Alternative SS-5, Capping, would involve engineering controls to minimize leachate production and soil contact via installation of a multilayer cap. Long-term maintenance and monitoring of the cap would be required to ensure its effectiveness.

Alternative SS-4, Excavation and Off-Site Treatment/Disposal, would remove soil contaminants to levels protective of human health and the environment. The risks posed by the contaminated soils would be reduced. The threat of further ground-water degradation would be reduced by controlling the infiltration of soil contaminants. This alternative would provide long-term effectiveness and permanence.

Reduction in Toxicity, Mobility or Volume

Under Alternative SS-4, it is anticipated that soils contaminated with PCBs/organic compounds would be treated at an approved off-site incinerator, while soils contaminated with heavy metals would be disposed of at a landfill. Toxicity, mobility, and volume of contaminants would be reduced by treatment of the excavated soil at an approved off-site incinerator. Mobility of the heavy metals would be reduced by stabilization of the soil prior to disposal. However, the disposal of contaminated soil at an approved landfill without stabilization would not reduce the toxicity, mobility or volume of the contaminants.

Alternative SS-5, Capping, would reduce the mobility of contaminants. This alternative would not involve active treatment for the contaminated soil. The toxicity and volume of the soil contaminants would remain at current levels for an extended period of time. The volume of contaminants could increase if the cap fails or if future ground-water table fluctuations bring it into contact with contaminated soil.

Alternative GW-3, Extraction and Treatment of Ground Water, would reduce mobility and volume of the contaminants because it would reduce ground-water contamination and control migration. The treatment system would remove contaminants from the extracted ground water, thereby reducing their mobility and volume.

Short-Term Effectiveness

Risks to workers and nearby residents from airborne contaminants would be minimized during the implementation of Alternative SS-4 or SS-5 through the use of appropriate engineering controls and a comprehensive health and safety plan.

Appropriate levels of protection for workers would be specified in the health and safety plan to avoid direct contact with contaminated soils and ground water during construction activities called for in Alternative GW-3.

The suspected presence of DNAPLs at the Site, which is characterized by the high concentrations of PCE and TCE in the shallow ground water, may have an influence on the time frame required or ability to fully achieve cleanup levels.

Alternatives SS-4 and SS-5 would take approximately 1 and 2 years, respectively, to implement. The implementation period for Alternative GW-2 is estimated to be 6 months, while Alternative GW-3 is approximately 30 years.

Implementability

Under Alternative SS-4, excavation would involve conventional and readily implementable construction methods. Acceptance by an approved treatment/disposal facility is not expected to pose a problem due to the small quantity of contaminated soil that would be sent off site.

Impermeable multi-layer caps, as described in Alternative SS-5, are a proven technology, involve readily available materials, and could be readily implemented.

Alternative GW-3 would include the installation of an interceptor trench, ground-water extraction wells, a ground-water collection/piping system, precipitation process equipment, an ultra-filtration unit, an air stripping tower, and associated piping and instrumentation. There is sufficient property on site to construct and install this equipment. Construction and installation of these components can be accomplished using common techniques and readily available equipment.

Interceptor trenches and extraction wells are proven technologies for extracting ground water. The extraction wells would be placed near potential source areas to enhance removal of the contaminants and reduce migration. Precipitation and ultra-filtration processes are proven technologies for the removal of heavy metals found in ground water, and have often been used to reduce the levels of metals in wastewater. Air stripping of VOCs is a proven technology. All the process units required for the treatment system are readily available, transportable to the Site, and easily installed. Sludge generated during treatment would require transportation to an approved facility on a periodic basis.

Cost

Estimated capital costs, annual O&M costs, and the total present worth of all the remedial alternatives are summarized in Tables 4A and 4B. Present worth costs are based on a 30-year period and a discount rate of 5 percent.
Alternative GW-3, Extraction and Treatment of Contaminated Ground Water, is the most expensive, with a present worth cost of $5,914,000.

The estimated present worth cost of Alternative SS-4 is $739,000. The most costly alternative is Alternative SS-5, with a present worth cost of $2,180,000.

State Acceptance

The New Jersey Department of Environmental Protection and Energy concurs with the preferred alternatives.

Community Acceptance

Community acceptance was evaluated after the close of the public comment period. Written comments received during the public comment period, as well as verbal comments during the public meeting on May 13, 1992, were evaluated. The response to those comments are addressed in the Responsiveness Summary.

Comments received during the public comment period indicated that the local residents were in favor of the preferred alternatives for the remediation of ground-water and soil contamination (i.e., GW-3 and SS-4). However, some local residents were dissatisfied with the Proposed Plan and the preferred remedial alternatives with respect to sediments. They believe that the Proposed Plan should have included remedial alternatives to address sediment contamination, particularly in the wetlands.

SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, the NJDEPE and EPA have determined that Alternatives SS-4 and GW-3 constitute the remedy that is protective of human health and the environment, will maintain protection over time, and that will minimize untreated waste.

The soil and ground-water cleanup levels for the Ellis Property Site are listed in Tables 5 and 6. NJDEPE has requested that soil and ground-water contamination at the Site be remediated to the levels specified in its Proposed Cleanup Standards for Contaminated Sites (February 1992), shown in Tables 7A and 7B. These proposed standards are not recognized as ARARs under Section 121(d) of CERCLA because they are not yet promulgated. However, EPA has determined that further remediation of the soil and ground water at the Site to the levels requested by the NJDEPE, does not conflict, or is not inconsistent, with the selected remedy. The NJDEPE has agreed to fund the incremental costs associated with this additional cleanup.

The major components of the selected remedy include the following:

- Excavation of contaminated soil and treatment/disposal at an approved off-site facility;

- Extraction of contaminated ground water from the shallow aquifer underlying the Site;

- Treatment of the contaminated ground water in a facility to be constructed on site;

- Disposal of the treated ground water on the Site by reinjection; and

- Implementation of an environmental monitoring program to ensure the effectiveness of the remedy.

The goal of this remedial action is to restore the ground water to its beneficial use, in this case, a source of drinking water. However, EPA recognizes that the selected remedy may not achieve this goal because of the technical difficulties associated with achieving ground-water cleanup levels. It may become apparent, during implementation or operation of the ground-water extraction/treatment system, that contaminant levels have ceased to decline and are remaining constant at levels higher than the remediation goal. In such a case, the systems' performance standards and/or the remedy may be reevaluated. Performance monitoring of the ground-water extraction and treatment system will be implemented. The data collected would be used to suggest system adjustments or modifications to provide more effective or efficient attainment of cleanup levels. Such adjustments or modifications may include: increasing or decreasing the extraction rate, initiating a pulsed pumping schedule, installing additional extraction wells (or drains), or ceasing extraction at wells where cleanup levels have been achieved. Monitoring data will be used to assess the effectiveness of the modifications implemented and may be used to re-assess the time frame required to achieve cleanup levels.

While a DNAPL source was not observed during the RI, further investigations will be conducted during the design phase to locate, or determine, the existence of such a source. If a DNAPL source is found, it will be addressed in the ground-water extraction and treatment system design.

Because the ground-water extraction system may adversely impact the wetlands, a wetlands assessment will be conducted during the design phase to evaluate the potential effects due to the extraction and discharge of ground water. Adverse impacts to the wetlands will be mitigated through engineering controls to the maximum extent practicable.

STATUTORY DETERMINATIONS

The remedy selected by EPA for ground-water and soil remediation at the Site complies with the requirements of Section 121 of CERCLA, as amended by SARA. The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable, or relevant and appropriate to this action, and is cost-effective. The selected remedy utilizes permanent solutions, and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable. The statutory preference for treatment that reduces toxicity, mobility or volume will be satisfied by the selected remedy. The selected remedy provides the best balance of trade-offs among the criteria. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment, dealing effectively with the threats posed by the contaminants which were identified.

The principal threat posed by the Site is the contaminated soils. The pathways associated with this threat include the infiltration of soil contaminants into the ground water and the potential migration of contaminated ground water into the deeper aquifers. By excavating the soil contaminants, and extracting and treating the contaminated ground water, the threats to human health and the environment will be reduced. Contaminants in the ground water will be reduced to levels that are acceptable for drinking water. The removal of soil contaminants will prevent further degradation of the wetlands caused by surface soil erosion.

Compliance with ARARs

The selected remedy will comply with the substantive requirements of the statutes and regulations listed in Table 8 to the extent they are applicable or relevant and appropriate to the remediation at this Site.

Action-Specific ARARs

Sludge produced by the ground-water treatment system and excavated soils will be disposed in accordance with RCRA requirements at RCRA-permitted facilities. The excavated soil will be stabilized prior to disposal, if necessary. Sludge and soil will be disposed at a facility that meets RCRA requirements. PCB-contaminated soil will be treated at a facility that meets TSCA requirements. Federal and State Department of Transportation requirements, including hazardous waste manifests, will be met for transportation of sludge and excavated soil from the Site to treatment/disposal facilities.

The air stripper will be designed to meet the New Jersey Air Pollution Control Regulations for VOC and toxic emissions (NJAC 7:27-16 & 17). The ground-water treatment system will be designed to treat the extracted ground water to MCLs prior to reinjection.

Chemical-Specific ARARs

The contaminants of concern in the ground water will be remediated to meet MCLs. The cleanup levels for the ground-water contaminants are listed in Table 6. These levels represent the concentrations which would be attained in the treated water before reinjection. The discharge of treated ground water will meet the levels specified in the New Jersey Ground Water Quality Criteria (Table 9).

Emissions from the air stripper will be designed to comply with the New Jersey Air Pollution Control Regulations for VOC and toxic emissions (NJAC 7:27-16 & 17).

The cleanup levels for soils are provided in Table 5. The selected remedy will reduce exposure risks posed by site soils to the acceptable range of 10^{-4} to 10^{-6} for carcinogens, and to an HI less than 1.0 for noncarcinogens.

Location-Specific ARARs

The contaminated ground water, which is located in a sole source aquifer, will be treated to meet Federal and State drinking water MCLs.

To comply with the National Historic Preservation Act, a Stage IB excavation survey will be conducted during the remedial design phase. If cultural resources are found, a cultural resources mitigation plan will be developed to reduce the impact to these resources as much as possible.

In addition, a survey of the Site will be conducted during the remedial design phase to confirm the presence or absence of swamp pink and other threatened/endangered species. If threatened/endangered species are found to inhibit the Site, impacts to the species and its habitat will be minimized to the maximum extent practicable.

The substantive requirements of the Freshwater Wetlands Act (NJAC 7:7A-1.1 et seq.) will be met. The wetlands delineation will be extended to include all areas that could be affected by the installation of an interceptor trench and/or ground-water extraction wells.

To ensure that remedial action process equipment and buildings are not constructed or installed in flood-prone areas, the remedial design activities will include a 100-year and 500-year floodplain delineation. The substantive requirements of Executive Order 11988, Protection of Floodplains, and the New Jersey Flood Hazard Area Control Act (NJSA 58:16A-50 et seq.) will be met if the floodplain delineation shows that facilities would be located in areas subject to flooding.

Advisories, Guidance and Criteria To Be Considered

The shipment of hazardous wastes off site to a treatment/disposal facility will be conducted in accordance with EPA's Office of Solid Waste and Emergency Response Directive No. 9834.11, "Revised Procedures for Planning and Implementing Off-site Response Actions." The intent of this directive is to ensure that facilities authorized to accept CERCLA-generated waste are in compliance with RCRA operating standards.

Cost-Effectiveness

Of the alternatives which most effectively address the threats posed by site contamination, the selected remedy provides for overall effectiveness in proportion to its cost. The estimated total project cost is $6,653,000.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

Contaminants in the ground water will be removed and treated before reinjection. Hazardous wastes generated by the treatment process will be disposed of at an approved off-site facility. This will significantly reduce the toxicity, mobility and volume of the contaminants, and offers a permanent solution to the risks posed by the contaminated ground water. The treatment of soils contaminated with PCBs/organic compounds at an approved off-site incinerator will significantly reduce the toxicity, volume and mobility.

The disposal of heavy metals-contaminated soil at an approved offsite landfill does not represent a permanent solution with respect to the risks associated with the contaminants because toxicity, volume or mobility would not be reduced. However, treatment of the soil by stabilization prior to disposal, if required, would reduce the mobility of the contaminants. As demonstrated in the FS, treatment of all the soil contaminants by one single technology was not practicable. Furthermore, the cost of constructing an on -site treatment system was not justified by the small volume of metals-contaminated soil (690 yd[3]). Considering the relatively small volume of metals-contaminated soil, EPA believes that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner.

Preference for Treatment as a Principal Element

With respect to ground-water contamination, the selected remedy satisfies the statutory preference for treatment as a principal element. The selected remedy reduces levels of contaminants in the ground water through treatment using precipitation and ultrafiltration for metals and air stripping for VOCs, thereby reducing the risk to human health.

The disposal of heavy metals-contaminated soil in an approved offsite landfill without stabilization does not satisfy the statutory preference for treatment. Due to the different types of contaminants present in the soil, treatment of the soil by one technology is not practicable. As shown in the FS, there was no one single treatment technology that was effective for treating organic compounds, PCBs, and heavy metals in soils; however, contaminated soils will be stabilized prior to disposal, if required. The selected remedy calls for the off-site treatment of soil contaminated with PCBs and/or organic compounds, and hence, satisfies the preference for treatment for this portion of the remedy.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Ellis Property Site was released to the public on May 1, 1992. The Proposed Plan identified the preferred alternatives for ground-water and soil remediation. EPA reviewed all written and verbal comments received during the public comment period. Upon review of these comments, EPA determined that no significant changes to the selected remedy, as it was originally identified in the Proposed Plan, were necessary.

APPENDIX I

FIGURES

Figure 1 Ellis Property Site Location

Figure 2 Ellis Property Site Plan

Figure 3 Ellis Property Site Drainage

APPENDIX II

TABLES

Table 1A Endangered/Threatened Species Observed Within a Three-Mile Radius of the Ellis Property Site.

Table 1B Endangered/Threatened Species Occurring in Burlington County, New Jersey.

Table 2 Predominant Contaminants and Range of Concentrations Detected at the Ellis Property Site.

Table 3 Comparison of Predominant Ground-water Contaminants Found at the Ellis Property Site With Drinking Water Standards.

Table 4A Summary of Remedial Alternative Costs for Soil.

Table 4B Summary of Remedial Alternative Costs for Ground Water.

Table 5 EPA's Risk-based Soil Remediation Levels.

Table 6 Ground-Water Remediation Levels for Predominant Contaminants

Table 7A NJDEPE's Proposed Soil Cleanup Standards for Contaminated Sites (February 1992)

Table 7B NJDEPE's Proposed Ground Water Cleanup Standards for Contaminated Sites (February 1992)

Table 8 Summary of Federal and State Applicable or Relevant and Appropriate Requirements (ARARs) for the Ellis Property Site.

Table 9 Ground Water Quality Criteria (NJAC 7:9-6)

Table 1A. Endangered/Threatened Species Observed Within a Three-Mile Radius of the Ellis Property Site

COMMON NAME	SCIENTIFIC NAME	CLASSIFICATION[a]
Upland piper	Bartramia longicauda	Endangered
Bog turtle	Clemmys muhlenbergii	Endangered
Pine Barrens treefrog	Hyla andersonii	Endangered
Grasshopper sparrow	Ammodramus savannarum	Threatened
American bittern	Botaurus lentiginosus	Threatened
Wood turtle	Clemmys insculpta	Threatened
Bobolink	Dolichonyx orhyzovorus	Threatened
Red-headed woodpecker	Melanerpes erythrocephalus	Threatened

<Footnote>
a Classified by the State of New Jersey.
</footnote>

Table 1B. Endangered/Threatened Species Occurring in Burlington County, New Jersey

COMMON NAME	SCIENTIFIC NAME	CLASSIFICATION[a]
Cooper's hawk	Accipiter cooperii	Endangered
Corn snake	Elaphe guttata	Endangered
Northern harrier	Circus cyaneus	Endangered
Pied-billed grebe	Podilymbus podiceps	Endangered
Tiger salamander	Ambystoma tigrinum	Endangered
Timber rattlesnake	Crotalus horridus	Endangered
Vesper sparrow	Pooecetes gramineus	Endangered
Barred owl	Strix varia	Threatened
Black rail	Laterallus jamaicensis	Threatened
Brook trout	Salvelinus fontinalis	Threatened
Great blue heron	Ardea herodias	Threatened
Mud salamander	Pseudotriton montanus	Threatened
Osprey	Pandion haliaetus	Threatened
Pine snake	Pituophis melanoleucus	Threatened

<Footnote>
a Classified by the State of New Jersey.
</footnote>

Table 4A. Summary of Remedial Alternative Costs for Soil[a]

Alternative SS-1: NO ACTION

Estimated Capital Cost:	$ 0
Estimated Annual Operation & Maintenance (O&M) Cost:	$ 42,000
Estimated Net Present Worth Cost:	$117,000
Estimated Implementation Time Frame:	None

Alternative SS-2: INSTITUTIONAL CONTROLS

Estimated Capital Cost:	$ 40,000
Estimated Annual O&M Cost:	$ 25,000
Estimated Net Present Worth Cost:	$110,000
Estimated Implementation Time Frame:	6 months

Alternative SS-4: EXCAVATION AND OFF-SITE TREATMENT/DISPOSAL

Estimated Capital Cost:	$560,000
Estimated Annual O&M Cost:	$188,200[b]
Estimated Net Present Worth Cost:	$739,000
Estimated Implementation Time Frame:	1 year

Alternative SS-5: CAPPING OF SURFACE SOILS

Estimated Capital Cost:	$630,000
Estimated Annual O&M Cost:	$100,800
Estimated Net Present Worth Cost:	$2,180,000
Estimated Implementation Time Frame:	2 years

<Footnotes>
a Alternative SS-3, Excavation and on-site treatment, is not included because it did not pass the screening process. b One year only. </footnotes>

Table 4B. Summary of Remedial Alternative Costs for Ground Water

Alternative GW-1: NO ACTION

Estimated Capital Cost:	$ 30,000
Estimated Annual O&M Cost:	$ 61,000
Estimated Net Present Worth Cost:	$ 200,000
Estimated Implementation Time Frame:	None

Alternative GW-2: INSTITUTIONAL CONTROLS

Estimated Capital Cost:	$ 74,000
Estimated Annual O&M Cost:	$ 180,000
Estimated Net Present Worth Cost:	$ 575,000
Estimated Implementation Time Frame:	6 months

Alternative GW-3: EXTRACTION AND TREATMENT OF CONTAMINATED GROUND WATER

Estimated Capital Cost:	$1,340,000
Estimated Annual O&M Cost:	
years 1-3	$ 365,000
years 4-30	$ 283,000
Estimated Net Present Worth Cost:	$5,914,000
Estimated Implementation Time Frame:	30 years